

**WHAT IS CLAIMED IS:**

1. A method of training a neural network to perform decoding of a time-varying signal comprising a sequence of input symbols, which is coded by a coder such that each coded  
5 output symbol depends on more than one input symbol, characterised by repetitively:

providing a plurality of successive input symbols to the neural network and to the coder,

comparing the network outputs with the input signals; and

adapting the network parameters to reduce the differences therebetween.

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2. A method according to claim 1, further comprising supplying the network not only with the coded output symbols but also with at least some of the plurality of successive input symbols.

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3. A method of encoded communications in which input symbols are convolutionally encoded to provide, for each input symbol, a plurality of output symbols which depend on the input symbol, and the input symbol is transmitted together with the plurality of output symbols to a decoder.

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4. A neural network for decoding encoded communications in which input symbols are convolutionally encoded to provide, for each input symbol, a plurality of output symbols which depend on the input symbol, connected so as to feed back to its inputs least some of the decoded symbols it generates at its outputs.

5. A network according to claim 4, in which at least one of the input symbols is transmitted to the neural network together with the coded output symbols, and fed to its inputs together with the fed-back decoded symbols.

5 6. A device according to claim 4, comprising a programmable signal processing device programmed to perform said plurality of neuron computations on a signal.

7. A device according to claim 4, including an integrated circuit comprising a plurality of neuron computation devices operating to perform said neuron computations in parallel.

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8. A communications terminal device operable to communicate selectively over a communications channel in a plurality of different communications modes, comprising a data processing device for processing time-varying signals, said data processing device being arranged to implement a neural network according to claim 4.

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9. A device according to claim 8, operable to add a new communications mode by receiving new said parameter values via said communications channel.

10. A communications station for use in a system including a terminal according to claim 9, the station comprising means for transmitting a signal comprising new parameter values for neural computations, to add a new communications mode to said device.

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